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SERIES Y: GLOBAL INFORMATION  
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS,  
NEXT-GENERATION NETWORKS, INTERNET OF  
THINGS AND SMART CITIES

Next Generation Networks – Enhancements to NGN

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## **Scenarios and capability requirements of programmable log analysis in next generation networks**

Recommendation ITU-T Y.2343

# ITU-T Y-SERIES RECOMMENDATIONS

## GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS, NEXT-GENERATION NETWORKS, INTERNET OF THINGS AND SMART CITIES

### GLOBAL INFORMATION INFRASTRUCTURE

|                                           |             |
|-------------------------------------------|-------------|
| General                                   | Y.100–Y.199 |
| Services, applications and middleware     | Y.200–Y.299 |
| Network aspects                           | Y.300–Y.399 |
| Interfaces and protocols                  | Y.400–Y.499 |
| Numbering, addressing and naming          | Y.500–Y.599 |
| Operation, administration and maintenance | Y.600–Y.699 |
| Security                                  | Y.700–Y.799 |
| Performances                              | Y.800–Y.899 |

### INTERNET PROTOCOL ASPECTS

|                                                                    |               |
|--------------------------------------------------------------------|---------------|
| General                                                            | Y.1000–Y.1099 |
| Services and applications                                          | Y.1100–Y.1199 |
| Architecture, access, network capabilities and resource management | Y.1200–Y.1299 |
| Transport                                                          | Y.1300–Y.1399 |
| Interworking                                                       | Y.1400–Y.1499 |
| Quality of service and network performance                         | Y.1500–Y.1599 |
| Signalling                                                         | Y.1600–Y.1699 |
| Operation, administration and maintenance                          | Y.1700–Y.1799 |
| Charging                                                           | Y.1800–Y.1899 |
| IPTV over NGN                                                      | Y.1900–Y.1999 |

### NEXT GENERATION NETWORKS

|                                                                   |               |
|-------------------------------------------------------------------|---------------|
| Frameworks and functional architecture models                     | Y.2000–Y.2099 |
| Quality of Service and performance                                | Y.2100–Y.2199 |
| Service aspects: Service capabilities and service architecture    | Y.2200–Y.2249 |
| Service aspects: Interoperability of services and networks in NGN | Y.2250–Y.2299 |

### **Enhancements to NGN** **Y.2300–Y.2399**

|                                             |               |
|---------------------------------------------|---------------|
| Network management                          | Y.2400–Y.2499 |
| Network control architectures and protocols | Y.2500–Y.2599 |
| Packet-based Networks                       | Y.2600–Y.2699 |
| Security                                    | Y.2700–Y.2799 |
| Generalized mobility                        | Y.2800–Y.2899 |
| Carrier grade open environment              | Y.2900–Y.2999 |

### FUTURE NETWORKS

### CLOUD COMPUTING

### BIG DATA

### QUANTUM KEY DISTRIBUTION NETWORKS

### INTERNET OF THINGS AND SMART CITIES AND COMMUNITIES

|                                                         |               |
|---------------------------------------------------------|---------------|
| General                                                 | Y.4000–Y.4049 |
| Definitions and terminologies                           | Y.4050–Y.4099 |
| Requirements and use cases                              | Y.4100–Y.4249 |
| Infrastructure, connectivity and networks               | Y.4250–Y.4399 |
| Frameworks, architectures and protocols                 | Y.4400–Y.4549 |
| Services, applications, computation and data processing | Y.4550–Y.4699 |
| Management, control and performance                     | Y.4700–Y.4799 |
| Identification and security                             | Y.4800–Y.4899 |
| Evaluation and assessment                               | Y.4900–Y.4999 |

For further details, please refer to the list of ITU-T Recommendations.

# Recommendation ITU-T Y.2343

## Scenarios and capability requirements of programmable log analysis in next generation networks

### Summary

Recommendation ITU-T Y.2343 specifies scenarios and capability requirements for programmable log analysis assurance in next generation networks (NGN-PLA).

This Recommendation first provides an overview of programmable log analysis in next generation networks. This Recommendation introduces the ecosystem for programmable log analysis in next generation networks, including roles and sub roles such as: log provider of NGN-PLA; log collection and forwarding service provider of NGN-PLA; log analysis service provider of NGN-PLA; log storage service provider of NGN-PLA; and log analysis service customer of NGN-PLA. This Recommendation then describes the requirements of programmable log analysis in next generation networks which are derived from the scenario use cases introduced in Appendix I. Based on the overview and requirements, this Recommendation specifies programmable log analysis capabilities assurance for next generation networks.

### History

| Edition | Recommendation | Approval   | Study Group | Unique ID*                                                                |
|---------|----------------|------------|-------------|---------------------------------------------------------------------------|
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### Keywords

Capability, next generation networks, programmable log analysis, requirements.

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\* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

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## Table of Contents

|                                                                                                    | Page |
|----------------------------------------------------------------------------------------------------|------|
| 1 Scope .....                                                                                      | 1    |
| 2 References.....                                                                                  | 1    |
| 3 Definitions .....                                                                                | 1    |
| 3.1 Terms defined elsewhere .....                                                                  | 1    |
| 4 Abbreviations and acronyms .....                                                                 | 2    |
| 5 Conventions .....                                                                                | 2    |
| 6 Overview of NGN-PLA.....                                                                         | 3    |
| 6.1 Introduction of NGN-PLA .....                                                                  | 3    |
| 6.2 NGN-PLA ecosystem and roles .....                                                              | 3    |
| 7 Requirements of NGN-PLA .....                                                                    | 5    |
| 7.1 Log collection related requirements .....                                                      | 5    |
| 7.2 Log storage related requirements .....                                                         | 6    |
| 7.3 Log pre-processing related requirements .....                                                  | 6    |
| 7.4 Log visualization related requirements .....                                                   | 6    |
| 7.5 Log alarming related requirements.....                                                         | 6    |
| 7.6 Log analysis requirements .....                                                                | 7    |
| 7.7 Log forwarding related requirements .....                                                      | 8    |
| 8 Capabilities of NGN-PLA .....                                                                    | 8    |
| 8.1 Mapping relationship between requirements and capabilities.....                                | 8    |
| 8.2 Log collection related capabilities.....                                                       | 9    |
| 8.3 Log pre-processing related capabilities .....                                                  | 9    |
| 8.4 Log storage related capabilities .....                                                         | 9    |
| 8.5 Programmable log analysis related capabilities .....                                           | 9    |
| 8.6 Log visualization related capabilities .....                                                   | 10   |
| 8.7 Log management related capabilities .....                                                      | 10   |
| 8.8 Security and protection related capabilities.....                                              | 11   |
| Appendix I – Use cases and scenarios of programmable log analysis in next generation networks..... | 12   |



# Recommendation ITU-T Y.2343

## Scenarios and capability requirements of programmable log analysis in next generation networks

### 1 Scope

This Recommendation specifies programmable log analysis in next generation networks (NGN-PLA), which addresses capabilities of programmable log analysis in next generation networks, and derived requirements from use cases. In particular, the scope of this Recommendation includes:

- Overview of programmable log analysis in next generation networks.
- Requirements of programmable log analysis in next generation networks.
- Capabilities of programmable log analysis in next generation networks.
- Use cases of programmable log analysis in next generation networks.

### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

|                  |                                                                                                                          |
|------------------|--------------------------------------------------------------------------------------------------------------------------|
| [ITU-T Y.2001]   | Recommendation ITU-T Y.2001 (2004), <i>General overview of NGN</i> .                                                     |
| [ITU-T Y.2011]   | Recommendation ITU-T Y.2011 (2004), <i>General principles and general reference model for Next Generation Networks</i> . |
| [ITU-T Y.2201]   | Recommendation ITU-T Y.2201 (2009), <i>Requirements and capabilities for ITU-T NGN</i> .                                 |
| [ITU-T Y.2701]   | Recommendation ITU-T Y.2701 (2007), <i>Security requirements for NGN release 1</i> .                                     |
| [ITU-T M.3016.0] | Recommendation ITU-T M.3016.0 (2005), <i>Security for the management plane: Overview</i> .                               |
| [ITU-T M.3060]   | Recommendation ITU-T M.3060/Y.2401 (2006), <i>Principles for the Management of Next Generation Networks</i> .            |

### 3 Definitions

#### 3.1 Terms defined elsewhere

This Recommendation uses the following term defined elsewhere:

**3.1.1 next generation network (NGN)** [ITU-T Y.2001]: A packet-based network which is able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.

### 3.2 Terms defined in this Recommendation

None.

## 4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

|         |                                                       |
|---------|-------------------------------------------------------|
| AN      | Access Network                                        |
| CN      | Core Network                                          |
| DFS     | Distributed File System                               |
| KPI     | Key Performance Indicator                             |
| LASC    | Log Analysis Service Customer                         |
| LCFSP   | Log Collection and Forwarding Service Provider        |
| LP      | Log Provider                                          |
| LSSP    | Log Storage Service Provider                          |
| NGN     | Next Generation Network                               |
| NGN-PLA | Programmable Log Analysis in Next Generation Networks |
| NoSQL   | Not only SQL                                          |
| PLA     | Programmable Log Analysis                             |
| PLASP   | Programmable Log Analysis Service Provider            |
| QoS     | Quality of Service                                    |
| RDBMS   | Relational Database Management System                 |
| SVM     | Support Vector Machine                                |
| UE      | User Equipment                                        |

## 5 Conventions

In this Recommendation:

The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this document is to be claimed.

The keywords "is prohibited from" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this document is to be claimed.

The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement need not be present to claim conformance.

The keywords "is not recommended" indicate a requirement which is not recommended but which is not specifically prohibited. Thus, conformance with this specification can still be claimed even if this requirement is present.

The keywords "can optionally" indicate an optional requirement which is permissible, without implying any sense of being recommended. This term is not intended to imply that the vendor's implementation must provide the option and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with the specification.

## 6 Overview of NGN-PLA

### 6.1 Introduction of NGN-PLA

Network log refers to the time-stamped machine data generated by the network, which records the relevant information of network operation, including the key elements such as hardware, software, operating environment, and even the monitoring of system operation, which means a lot in network analysis, diagnostics and maintenance.

Next generation network (NGN) refers to a packet-based network, which is able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies [ITU-T Y.2001]. The major goal of the NGN is to facilitate convergence of networks and convergence of services. Its main characteristics include decoupling of services and transport, generalized mobility and converged services between fixed/mobile. [ITU-T M.3060] suggests that NGN is required to provide the management capabilities, which will improve end-user service quality. [ITU-T M.3016.0] also suggests that the network should be able to manage fault and audit trails by using activity logs.

As NGN becomes more flexible, network logs will be multiplied in capacity, type, generation speed, and so on accordingly. This trend comes with higher requirements in log processing speed, concurrency, analysis dimensions and other aspects of log analysis methods. With the development and maturity of IT technologies, new network log analysis methods have emerged, such as programmable log analysis based on machine learning. These methods combine the diversity, timeliness and other characteristics of logs and overcome the limitations of traditional tools in function and performance, and are cost-effective solutions. Programmable log analysis refers to writing scripts based on machine learning or other intelligent technologies to configure analysis and association rules, thus realizing the search, statistics, identification and alarm of log data. Programmable log analysis can learn key information such as user behaviour, security risk, capacity consumption, quality of service (QoS) and network failures, in an automatic manner rather than in a manual way. In addition, programmable log analysis can predict potential faults and performance failures ahead of time and help network managers act upon proactively in the NGN environment.

NGN-PLA is a specific programmable log analysis which is utilized in NGN, satisfying the specific requirements in NGN, such as reliability, efficient management, timely maintenance, high-level security, etc. NGN-PLA supports the features of NGN and has enhancements by taking advantage of the programmable log analysis concept and technologies.

### 6.2 NGN-PLA ecosystem and roles

This clause describes an environment, called the NGN-PLA ecosystem, with roles and sub-roles. It also defines necessary activities for roles providing and consuming log analysis services as well as relationships between roles. In addition, according to the functional requirements, defined in [ITU-T Y.2201] and the general principle defined in [ITU-T Y.2011] of the NGN, the NGN-PLA ecosystem interacts with the management plane and user plane of NGN, which has been defined in clause 3.1.7 and clause 3.1.17 of [ITU-T Y.2011]. The detailed interactive mode is also illustrated in Figure 6-1.

The NGN-PLA ecosystem includes the following roles:

- Log provider of NGN-PLA;
- Log collection and forwarding service provider of NGN-PLA;
- Programmable log analysis service provider of NGN-PLA;
- Log storage service provider of NGN-PLA;
- Programmable log analysis service customer of NGN-PLA.

The NGN-PLA ecosystem is shown in Figure 6-1.